THURSDAY, JANUARY 23, 1896.

SOME RECENT WORKS ON BUTTERFLIES AND MOTHS.

A Handbook of British Lepidoptera. By Edward Meyrick, B.A., F.Z.S., F.L.S., F.E.S., Assistant Master at Marlborough College. (London: Macmillan and Co., 1895.)

British and European Butterflies and Moths (Macro-Lepidoptera). By A. W. Kappel, F.L.S., F.E.S. (Assistant Librarian, Linnean Society), and W. Egmont Kirby, L.S.A. With thirty coloured plates by H. Deuchert and S. Slocombe. (London: Ernest Nister, 1895.)

Die Artbildung und Verwandschaft bei den Schmetterlingen. II. Theil. Eine systematische Darstellung der Abänderungen, Abarten, und Arten der Schwalbenschwanz-ähnlichen Formen der Gattung Papilio. Von Dr. G. H. Theodor Eimer, Professor der Zoologie und vergleichenden Anatomie zu Tübingen. Unter Mitwirkung von Dr. K. Fickert, I. Assistent an der Zoologischen Anstalt daselbst. Mit 4 Tafeln in Farbendruck und 7 Abbildungen im Texte. (Jena: Gustav Fischer, 1895.)

LAST year was remarkable for the unusual number of publications on *Lepidoptera* which were issued from the press, especially in England. In addition to serial works and reprints, many independent works appeared, several of which have already been noticed in the columns of NATURE; and the three new books to which the present article refers, shows that the activity of entomologists in this direction is still as great as ever.

It is singular that, notwithstanding the great increase of interest taken in the British *Lepidoptera* of late years, Mr. Meyrick's is really the first serious attempt at a student's manual of the order which has yet appeared. We have any amount of popular illustrated books; but nothing beyond, except Stainton's "Manual of British Butterflies and Moths," a book nearly forty years old (though still of great value and much used, especially as it gave the only available synopsis of the *Micro-Lepidoptera*, which are generally neglected in popular works), and written rather for beginners than for students. Mr. Meyrick now offers us, in a compact volume of nearly 850 pages, a series of carefully drawn up descriptions of genera and species, with notices of localities, range, transformations, &c., and numerous systematic and phylogenetic tables; but there is not a trace of popular padding, and no illustrations, except occasional woodcuts of neuration.

As is known to all who have examined Mr. Meyrick's previous entomological writings (which have chiefly been devoted to the *Lepidoptera* of Australia and New Zealand), he attaches great importance to the neuration of the wings of the insects; and in the present volume he has adopted a new classification of his own, based mainly on the wing-neuration, which will appear to most of his readers little short of revolutionary. Suffice it to say that he divides the *Lepidoptera* into nine main groups, as follows: (1) *Caradrinina*, including the bulk of the species generally classed under *Arctiidæ*, *Liparidæ*, and part of *Noctuæ*; (2) *Notodontina*, including, in addition to the *Notodontidæ*, the *Saturniadæ*, *Sphingidæ*, *Geometræ*, and part of *Noctuæ*; (3) *Lasiocampina*, including also the *Drepanulidæ* and *Endromididæ*; (4) *Papilionina*, including the butterflies; (5) *Pyralidina* (from which group Mr. Meyrick believes the butterflies have branched), including also the Crambi and Plume moths; (6) *Psychina*, with which are included the *Zeuzeridæ*, *Zygænidæ*, and *Heterogenidæ*; (7) *Tortricina*, with which is included *Trypanus cossus*, L.; (8) *Tineina*, including also *Ægeriadæ*; and (9) *Micropterygina*, including the *Hepialidæ* and *Micropterygidæ*. Comment is needless; every one who knows our British *Lepidoptera* will recognise the sweeping character of the changes proposed; and how far they will ultimately be accepted, no one can venture to predict at present.

We will now turn to the second book on our list, which is a complete contrast to the last in design and execution. It is a handsomely got-up book intended for popular use, and illustrated with a series of excellent coloured plates, representing a considerable number of the more interesting and conspicuous butterflies and larger moths of Great Britain and the adjacent parts of Europe. All, or nearly all, the species not figured, but which fall within the limits of the book, are described in the text. No innovations of arrangement or nomenclature are attempted; and English as well as Latin names are used throughout. The book extends to the *Geometræ* inclusive; but it is more fully illustrated in the earlier groups than in the later. Useful information on technical terms, collecting and preserving, and other general matters connected with *Lepidoptera*, will be found in the introduction. This book may be safely recommended as a desirable addition to school libraries, or public institutions, or as a present to a young friend interested in natural history.

The last book on our list is one of a very different kind to the others. It is an elaborate philosophical study of the various forms presented by three groups of swallow-tailed butterflies, represented by *Papilio Turnus*, *Machaon*, and *Asterias*, in various parts of their range. These are mainly Palæarctic and Nearctic in their range. In the first volume of his work, published in 1889, Dr Eimer discussed the groups represented by *Papilio Podalirius*, *Antiphates*, *Anticrates*, *Ajax*, and *Policenes*, which are chiefly East Indian or African, though *P. Ajax* and its allies are American.

Dr. Eimer has come to the conclusion that natural selection will not account for the origin of species, though it may largely contribute to their preservation when already formed. This he expresses in a rather polemical preface, in which he claims to have practically demolished natural selection in the former sense. Perhaps it will be most fair to him to quote a paragraph, especially as it contains most of the technical terms which he uses in his work.

"In complete contrast to the teachings of Darwin, my butterflies everywhere display the origin of new peculiarities through orderly development in a few definite directions (Orthogenesis) on the basis of physiological causes, by organic increase (Organophysis). They show that it is really Genepistasis, or arrest of development at definite stages, which necessitates the separation into species of the organic chain which has

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thus originated, and which is, in fact, the cause of the origin of species, independently of, and apart from other causes, discussed in the following pages, such as impediments to fertilisation (Kyesamechanism), and sudden development (Halmatogenesis)."

It is probable that various causes, acting unequally in different groups of animals and plants, have contributed to the origin and differentiation of species ; and there is certainly much to be said in favour of the view that evolution proceeds along definite lines, and also that it is liable to be arrested at certain definite points. With respect to the latter phenomenon, we may refer to Dr. Leuthner's monograph of the *Odontolobidæ*, a family of East Indian stagbeetles, published in the *Transactions* of the Zoological Society for 1886, which illustrates this very clearly. It may also be observed in the common earwig.

Besides the discussion of the various points noted in the above-quoted paragraph, this work contains incidental remarks on the influence of heat and cold on butterflies reared artificially ; and on mimicry, &c., as well as a reply to some criticisms by the late Dr. Haase on the first volume of the work.

While the philosophical part of the book will be read with interest by students of evolution, the special part, with its excellent illustrations of closely allied species and varieties, will be useful to collectors of foreign butterflies generally.

RECENT WORKS ON PHYSIOLOGY.

A Manual of Physiology. By G. N. Stewart, M.A., D.Sc., M.D.Edin. (London : Ballière, Tindall, and Cox, 1895.)

Physiology. By A. Macalister, LL.D., M.D., F.R.S. "Manuals of Science Series." (London : Society for Promoting Christian Knowledge, 1895.)

Elementary Physiology. By J. R. Ainsworth Davis, B.A. (London : Blackie and Son, 1895.)

WE have at the present time several very excellent text-books of physiology in English, adapted for the various needs of different classes of students. And to prevent these being inconveniently increased, it is a matter of tacit agreement amongst teachers of physiology that it is undesirable to afford a welcome to any new text-book, unless it has itself the highest claims to recognition. These claims may be based either upon some novel method of treatment of the subject, or upon the impression on the work of an author's high personal authority.

Adopting such a standard of criticism as the above, we first proceed to consider Dr. Stewart's manual. The fact of the author possessing so brilliant a reputation in the application of physics to physiology, is sufficient to make a work at his hands of the utmost value in certain branches of the subject. There are other influences to which Dr. Stewart has been exposed, which also tend to enhance the value of his work. The teaching methods of the Edinburgh school involve both conciseness and dogmatism, and these are as desirable in elementary instruction as they are pernicious in more advanced.

The manual which Dr. Stewart has written is to be regarded as an elementary *text-book*, for it is really something more than a mere *manual*. The methods throughout involve a concise expression of varying views, and the author's personal preference for any particular view is clearly indicated. Such a method we consider very desirable in a book of this character. As regards the facts incorporated, they include in general the very latest work that the time of publication permitted, and indicate an acquaintance with the progress of physiology as is possible only with a specialist in that branch of science. Interwoven with the academic exposition are detailed instructions for practical work. We have not very much faith in the success of this innovation. It is extremely inconvenient for a student to have to carry from his home to his laboratory a somewhat bulky volume, and the instructions are of no value except in the laboratory. We certainly think that it would have been much better to have omitted from such a book as this all practical instruction. We would like to offer some criticism also upon this practical instruction. It is to a considerable extent of such a character as to be impossible even to an American student, though Dr. Stewart dwells on the greater opportunities existing on the other side of the Atlantic for practical investigation. We have some doubts, also, concerning the advisability of introducing the so-called electro-physiology to the extent that has been done. It is not that too many pages have been allotted to it ; on the contrary, if introduced at all, it requires many more than the author saw his way to give. The result is that, though so much has been referred to, it has been treated so briefly that the fault of brevity, vagueness, is only too apparent. We think that few students will derive the proper amount of information from this section unless it be largely supplemented by the personal instruction of a teacher.

For certain classes of students, however, the book will be of special service, and we think that it will undoubtedly be regarded as a valuable addition to our present text-books of physiology.

For Prof. Macalister's little manual we have nothing but praise. So much of elementary physiology as it is generally understood is identical with elementary anatomy that the physiologist is not at more advantage than the anatomist in describing the more elementary facts. A somewhat novel arrangement of the different points treated upon has been adopted. The author has commenced by describing the nature of food and digestion. This is already a matter of some slight acquaintance to one who has not studied physiology, and he is thus led on through partially familiar paths.

Sections then follow, treating of the blood, the circulatory system, respiration, the skeleton, joints, the nervous system, and the organs of the senses. A small amount of histology has also been introduced. The author throughout the book teaches valuable hygienic lessons from the explained phenomena. In a later edition a few corrections might be introduced ; and when that is done, the book will be an excellent guide to the explanation of elementary physiological principles.

Mr. J. R. Ainsworth Davis's work is intended by the author (1) for elementary students in general ; (2) for students of general biology who wish to supplement the subject on the physiological side ; (3) students of psychology ; (4) students of agriculture and dairying.

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